

CLAIMS

1. A perforated skin for an acoustic element, said skin consisting of at least one web (N1-N3; N4-N7) of substantially rectilinear fibers associated with a resin, the perforations in which define a regular repeat pattern (a,b,c; e,f,g,h), characterized in that the perforations (P1-P3; P5-P8) affect at least 25% of the skin and in that, at least over a major portion of the skin thus perforated, fibers (C1-C3; C4-C7) of said web or webs (N1-N3; N4-N7) are uninterrupted by the perforations (P1-P3; P5-P8).

2. The skin as claimed in claim 1, characterized in that it is perforated to 30-40%.

3. The skin as claimed in claim 1 or 2, characterized in that at least some of the fibers of at least one web (N1-N3; N4-N7) are substantially parallel to one another and oriented in such a way that they follow a series of parallel channels (C1 or C2 or C3; C4 or C5 or C6 or C7) free of perforations.

4. The skin as claimed in any one of claims 1 to 3, characterized in that it comprises at least two webs, in each of which at least certain fibers are substantially parallel to one another, said parallel fibers of one of the webs being oriented in such a way that they follow a first series of parallel channels (C1; C4) free of perforations and the parallel fibers of the other web being oriented in such a way that they follow a second series of parallel channels (C2 or C3; C5 or C6 or C7) free of perforations, the first series of channels (C1; C4) cutting the second series of channels (C2 or C3; C5 or C6 or C7).

5. The skin as claimed in any one of claims 1 to 4, in which the regular repeat pattern is an equilateral triangle (a,b,c), characterized in that it comprises at least one series of three webs (N1-N3), in each of which at least certain fibers are substantially parallel to one another, each web having its parallel fibers oriented

parallel to one of the sides (a-b, b-c, c-a) of the equilateral triangle.

6. The skin as claimed in any one of claims 1 to 4, in which the regular repeat pattern is a rectangle (e,f,g,h,), characterized in that it comprises at least one series of four webs (N4-N7), in each of which at least certain fibers are substantially parallel to one another, two of the webs (N4,N5) having their parallel fibers oriented parallel to each of the pairs of sides (e-f and g-h, e-h and f-g) of the rectangle and the other two webs (N6, N7) having their parallel fibers oriented parallel to each of the diagonals (e-g, f-h) of the rectangle.

7. The skin as claimed in any one of claims 1 to 6, characterized in that the fibers in said web or webs are unidirectional or virtually unidirectional fibers.

8. The skin as claimed in any one of claims 1 to 6, characterized in that at least two of said webs (N4,N5) belong to a fabric having fibers along a first direction and fibers along a second direction that cuts the first, said fabric being oriented in such a way that at least certain fibers along the first direction and at least certain fibers along the second direction follow channels (C4, C5) free of perforations.

9. An acoustic element formed from an external skin (1)/honeycomb (2)/internal skin (3) sandwich, said external skin being intended to be placed on the noise source side, characterized in that said external skin (1) is a skin as claimed in any one of claims 1 to 8.

10. The acoustic element as claimed in claim 9, characterized in that said external skin (1) is fastened, on its face opposite the honeycomb (2), to a porous woven metal fabric (4) from 1 to 2/10 mm in thickness and having a gas penetration resistance of between 20 and 40 Pa.s/m.

11. A process for manufacturing a skin as claimed in claim 4, which comprises, prior to the perforation step, a step of depositing said webs on a former for shaping purposes, characterized in that:

- in respect of the deposition, one lays:
 - . at least one web (N1; N4) of unidirectional or virtually unidirectional fibers associated with a resin in a first direction and
 - 5 . at least one second web (N2 or N3; N5 or N6 or N7) of unidirectional or virtually unidirectional fibers associated with a resin in a second direction that cuts the first; and
 - in respect of the perforation, one applies a pattern of such a geometry and of such an orientation relative to said first and second directions that at least certain fibers [C1 and (C2 or C3); C4 and (C5 or C6 or C7)] of the first and second webs remain uninterrupted.
- 10 12. The process as claimed in claim 11 for manufacturing a skin as claimed in claim 5, characterized in that:
 - in respect of the deposition, one lays:
 - . at least one first web (N1) of unidirectional or virtually unidirectional fibers associated with a resin in a first direction, 0° ,
 - . at least one second web (N2) of unidirectional or virtually unidirectional fibers associated with a resin in a second direction, at $+60^\circ$ to the first direction and
 - . at least one third web (N3) of unidirectional or virtually unidirectional fibers associated with a resin in a third direction, at -60° to the first direction; and
 - in respect of the perforation, one applies a pattern in the form of equilateral triangles (a,b,c) oriented in such a way that the first direction corresponds to that of one side (a-b) of an equilateral triangle of the pattern.
- 15 13. The process as claimed in claim 11 for manufacturing a skin as claimed in claim 6, characterized in that:
 - in respect of the deposition, one lays:

- . at least one first web (N4) of unidirectional or virtually unidirectional fibers associated with a resin in a first direction, 0° ,
 - . at least one second web (N5) of unidirectional or virtually unidirectional fibers associated with a resin in a second direction, at $+90^\circ$ to the first direction and
 - . at least one third and a fourth web (N6, N7) of unidirectional or virtually unidirectional fibers associated with a resin in third and fourth directions (X-X', Y-Y') along each of the respective diagonals of a rectangle of the future perforation pattern; and
 - in respect of the perforation, one applies a pattern in the form of rectangles (e,f,g,h), which are oriented in such a way that the third and fourth directions (X-X', Y-Y') correspond to those of the diagonals (e-g, f-h) of a rectangle of the pattern.
14. The process as claimed in claim 11 for manufacturing a skin as claimed in claim 6, in which case the rectangular pattern is a square pattern, characterized in that:
- in respect of the deposition, one lays:
 - . in a first direction, at least one fabric layer associated with a resin and comprising warp yarns and weft yarns substantially perpendicular to one another, the direction of said warp yarns being taken as the first direction and
 - . in a second direction, 45° to the first direction, at least one fabric layer associated with a resin and comprising warp yarns and weft yarns substantially perpendicular to one another, the direction of said warp or weft yarns being taken as the second direction; and
 - in respect of the perforation, one applies a pattern of squares oriented in such a way that the first direction corresponds to that of a diagonal of a square of the pattern.

15. A process for manufacturing a skin as claimed in
any one of claims 1 to 8, characterized in that it
consists, during the deposition, in orienting at least some
of the fibers which will remain uninterrupted after
5 perforation (C1-C3; C4-C7) in a direction corresponding to
a direction of maximum stress of the element, once in
service.